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(12) United States Patent  
Milillo et al.(10) Patent No.: US 6,421,767 B1  
(45) Date of Patent: Jul. 16, 2002(54) METHOD AND APPARATUS FOR  
MANAGING A STORAGE SYSTEM USING  
SNAPSHOT COPY OPERATIONS WITH  
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6,253,295 B1 \* 6/2001 Beal et al. .... 711/162(75) Inventors: Michael Steven Milillo, Louisville;  
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\* cited by examiner

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## (57) ABSTRACT

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U.S.C. 154(b) by 0 days.

A method and apparatus in a data processing system for managing data access to a plurality of storage devices. The present invention may be applied to copy operations involving virtual tracking. The plurality of storage devices is grouped into a set of groups. Responsive to a request for a copy operation to copy data from a first storage device to a second storage device, a determination is then made as to whether the first storage device and the second storage device are in the same group within the plurality of groups. Responsive to the first storage device and the second storage device being in the same group, a data file pointer to the original data is stored in a data structure for the second storage device. Responsive to an absence of the first storage device and the second storage device being in the same group, occurrence of the copy operation is prevented.

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711/114; 711/152; 711/161; 707/204(58) Field of Search 711/4, 111, 112,  
711/114, 152, 161, 162, 163; 707/204

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39 Claims, 10 Drawing Sheets

